

## WHAT IS CLAIMED IS:

1. An exhaust gas purification device of an engine, comprising:  
a catalyst disposed in an exhaust gas pipe of the engine for purification of an  
5 exhaust gas;  
a secondary air injection device that injects a secondary air into the exhaust  
gas pipe upstream of the catalyst so as to accelerate a warm-up of the catalyst at a  
time of a startup of the engine;  
a controller that:  
10 determining a degree of the warm-up of the catalyst;  
calculates a criterion output based on the determined degree of the  
warm-up of the catalyst;  
detects an output of the engine; and  
stops injection of the secondary air with an injection stop device  
15 provided that:  
the determined degree of the warm-up is greater than or equal  
to a predetermined criterion degree of the warm-up; and  
the detected output of the engine is greater than or equal to the  
calculated criterion output.  
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2. The exhaust gas purification device according to claim 1, wherein  
the controller determines the degree of the warm-up of the catalyst by determining an  
accumulated value of an amount of flow of a primary air taken into the engine after  
the startup of the engine.
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3. The exhaust gas purification device according to claim 1, wherein  
the controller detects the output of the engine based on a degree of opening of a  
throttle valve.
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4. The exhaust gas purification device according to claim 1, wherein  
the controller detects the output of the engine based on an amount of intake air taken  
into the engine.

5. The exhaust gas purification device according to claim 1, further comprising:

a cooling water temperature detector that detects a temperature of a cooling water of the engine; and

5 wherein the controller corrects the criterion output and the criterion degree of the warm-up based on the temperature of the cooling water.

6. The exhaust gas purification device according to claim 1, wherein the engine is an internal combustion engine.

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7. A method for purifying an exhaust gas for an engine, comprising:  
purifying the exhaust gas with a catalyst disposed in an exhaust gas pipe of the engine;

15 injecting a secondary air into the exhaust gas pipe so as to accelerate a warm-up of the catalyst at a time of a startup of the engine;

detecting a degree of the warm-up of the catalyst;

calculating a criterion output based on the degree of the warm-up detected;

detecting an output of the engine; and

stopping injection of the secondary air provided that:

20 the detected degree of the warm-up is greater than or equal to a predetermined criterion degree of the warm-up; and

the detected output of the engine is greater than or equal to the calculated criterion output.

25 8. The method according to claim 7, wherein the detected degree of the warm-up is based on an accumulated value of an amount of flow of a primary air taken into the engine after the startup of the engine.

9. The method according to claim 7, further comprising:

30 detecting a temperature of a cooling water of the engine; and

correcting the criterion output and the criterion degree of the warm-up based on the detected temperature of the cooling water.